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Effect of Fartlek and Sand Trainings on Selected Physical Fitness Variables among University Men Students

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Abstract
The purpose of the study was to find out the effects of fartlek training [FT] and Sand training [ST] on selected physical fitness components namely muscular endurance [ME] and cardiorespiratory endurance [CRE] among university men students. To achieve this purpose of the study, forty-five men students studying men students studying Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India were selected as subjects at random. Their age ranged between 18 to 24 years. The selected subjects were divided into three equal groups of fifteen each namely fartlek training group [FTG], Sand training group [STG] and control group [CG]. The experimental group I underwent fartlek training [FT] and group II underwent Sand training [ST] for three days per week for twelve weeks whereas the control group maintained their daily routine activities and no special training was given to them. The following physical fitness components, namely muscular endurance [ME] and cardiorespiratory endurance [CRE] were selected as criterion variables. The subjects of the three groups were tested on selected physical fitness components namely muscular endurance and cardiorespiratory endurance using standardized tests namely bend knee sit-ups and Cooper's 12 min Run / Walk test at prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significant difference, if any among the groups. Whenever the obtained F ratio was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any. The .05 level of confidence was fixed to test the level of significance which was considered appropriate. The results of the study showed that there was a significant difference exist among FTG, STG and CG on selected physical fitness components namely ME and CRE. And also, FTG and STG showed significant improvement on ME and CRE when compared to control group.

Keywords: Fartlek Training, Sand Training, Physical Fitness Variables, Muscular Endurance, Cardiorespiratory Endurance, ANCOVA, University Men Students

Introduction

Fartlek training, a Swedish term meaning speed play, is a versatile and dynamic form of interval training that blends continuous aerobic exercise with bursts of high-intensity efforts. Developed in the 1930s by Swedish coach Gösta Holmér, it was initially designed to help cross-country runners improve their speed and endurance simultaneously. Unlike traditional interval training, where specific distances or times are prescribed for the intervals, Fartlek allows for a more flexible approach, enabling athletes to vary their speed and intensity based on their perception and terrain (Midgley et al.). This method is particularly beneficial because it mimics the unpredictable nature of competitive sports, where athletes often have to adjust their pace and intensity in response to the demands of the race or game. The blend of aerobic and anaerobic conditioning makes Fartlek training effective for improving both endurance and speed, which is why it has been widely adopted across various sports disciplines (Billat).

Fartlek training also provides psychological benefits, as the unstructured format can help to reduce the monotony of traditional training routines, keeping athletes engaged and motivated (Laursen and Jenkins). Overall, Fartlek training is a valuable tool for athletes of all levels seeking to enhance their performance through a combination of endurance and speed work.

Sand training is a form of physical conditioning that utilizes sandy environments, such as beaches or desert areas, to enhance athletic performance and fitness. This training method is particularly beneficial due to the unique properties of sand, which provide an unstable surface that challenges balance, stability, and strength. The uneven and shifting nature of sand requires more effort from the muscles compared to stable surfaces, leading to increased muscle activation, improved coordination, and enhanced cardiovascular endurance (Giatsis et al.). The resistance provided by sand also reduces impact forces, making it a safer option for activities such as running and jumping. This aspect of sand training is especially useful for athletes recovering from injuries, as it allows them to maintain or improve their fitness levels with a reduced risk of re-injury (Binnie et al.). Additionally, sand training is often employed by athletes in sports that involve running or jumping, such as soccer, volleyball, and track and field, to improve their speed, agility, and explosive power (Lejeune et al.).

Sand training offers a unique and effective way to enhance physical fitness, combining the benefits of resistance training with reduced injury risk. Its application is widespread across various sports and rehabilitation programs, making it a valuable addition to an athlete's training regimen.

While Fartlek and Sand training are known to improve physical fitness, there is a limited number of studies comparing their effects on similar variables (e.g., endurance, speed, agility). Most existing studies focus on one or the other rather than a direct comparison. Research comparing the combined or differential effects of these training methods on specific physical fitness metrics would offer valuable insights. Most research on Fartlek and Sand training targets elite athletes or runners, with fewer studies on other populations such as adolescents, elderly individuals, or recreational athletes. There is limited research on the long-term sustainability and retention of fitness gains from Fartlek and Sand training. Many existing studies fail to account for possible gender-specific responses to different training stimuli.

Methodology

The purpose of the study was to find out the effects of fartlek training [FT] and Sand training [ST] on selected physical fitness components namely muscular endurance [ME] and cardiorespiratory endurance [CRE] among university men students. To achieve this purpose of the study, forty-five men students studying men students studying Department of Physical Education, Annamalai University, Chidambaram, Tamil Nadu, India were selected as subjects at random. Their age ranged between 18 to 24 years. The selected subjects were divided into three equal groups of fifteen each namely fartlek training group [FTG], Sand training group [STG] and control group [CG]. The experimental group I underwent fartlek training [FT] and group II underwent Sand training [ST] for three days per week for twelve weeks whereas the control group maintained their daily routine activities and no special training was given to them. The following physical fitness components, namely muscular endurance [ME] and cardiorespiratory endurance [CRE] were selected as criterion variables. The subjects of the three groups were tested on selected physical fitness components namely muscular endurance and cardiorespiratory endurance using standardized tests namely bend knee sit-ups and Cooper's 12 min Run / Walk test at prior and immediately after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significant difference, if any among the groups. Whenever the obtained F ratio was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean difference, if any. The .05 level of confidence was fixed to test the level of significance which was considered appropriate.

Training Programme

During the training period, Group I underwent fartlek training [FT] and Group II underwent Sand training [ST] for three days per week (alternative

days) for twelve weeks. Every day the workout lasted for 45 to 60 minutes approximately including warming up and warming down periods. Group III acted as control who did not participate in any strenuous physical exercises and specific training throughout the training period. However, they performed activities as per their curriculum.

Analysis of the Data

The analysis of covariance on selected physical fitness components of FTG, STG and CG have been analyzed and presented below.

Muscular Endurance

The analysis of covariance on muscular endurance of the pre and post test scores of FTG, STG and CG have been analyzed and presented in Table 1.

Table 1 Analysis of Covariance of the Data on Muscular Endurance of Pre and Post Tests Scores of FTG, STG and CG

Test	FTG	STG	CG	SOV	SS	df	MS	OF
Pre Test								
Mean	32.13	32.47	32.80	Between	3.33	2	1.67	0.131
SD	2.83	3.91	3.53	Within	535.87	42	12.76	
Post Test								
Mean	37.27	39.33	32.93	Between	320.04	2	160.02	10.655*
SD	4.49	3.20	3.41	Within	631.20	42	15.03	
Adjusted Post Test								
Mean	37.52	39.33	32.68	Between	353.79	2	176.89	22.51*
				Within	322.18	41	7.86	

*Significant at .05 level of confidence. The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively.

The adjusted post-test means of FTG, STG and CG are 37.52, 39.33 and 32.6 respectively. The obtained F ratio of 22.51 for adjusted post-test means is greater than the table value of 3.226 for df 1 and 42 required for significance at .05 level of confidence on muscular endurance.

Since, three groups were compared whenever the obtained F ratio for the adjusted post test was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean differences, if any and it was presented in table 1A.

Table 1A showed that the mean difference values between FTG and STG, FTG and CG, STG and CG on muscular endurance were 1.81, 4.84 and 6.65 respectively which were greater than the required confidence interval value 2.60 The results of the study showed that there was a significant difference between FTG and STG, FTG and CG, STG and CG on muscular endurance.

Table 1A The Scheffe's Test for the Differences between Paired Means on Muscular Endurance

FTG	STG	CG	MD	CI
37.52	39.33	-	1.81*	2.60
37.52	-	32.68	4.84*	2.60
-	39.33	32.68	6.65*	2.60

*Significant at .05 level of confidence

Cardiorespiratory Endurance

The analysis of covariance on cardiorespiratory endurance of the pre and post test scores of FTG, STG and CG have been analyzed and presented in Table 2.

Table 2 Analysis of Covariance of the Data on Cardiorespiratory Endurance of Pre and Post Tests Scores of FTG, STG and CG

Test	FTG	STG	CG	SOV	SS	df	MS	OF
Pre Test								
Mean	1412.67	1411.00	1417.33	Between	323.33	2	161.67	0.47
SD	17.69	19.68	16.52	Within	14596.67	42	347.54	
Post Test								
Mean	1464.00	1587.33	1420.67	Between	224333.33	2	112166.67	422.64*
SD	18.90	8.54	17.69	Within	11146.67	42	265.40	
Adjusted Post Test								
Mean	1464.26	1588.04	1419.70	Between	224549.94	2	112274.97	454.42*
				Within	10127.68	41	247.02	

*Significant at .05 level of confidence. The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.222 and 3.226 respectively.

The adjusted post-test means of FTG, STG and CG are 1464.26, 1588.04 and 1419.70 respectively. The obtained F ratio of 454.52 for adjusted post-test means is greater than the table value of 3.226 for df 2 and 41 required for significance at .05 level of confidence on cardiorespiratory endurance.

Since, three groups were compared whenever the obtained F ratio for the adjusted post test was found to be significant, the Scheffe's test was applied as post hoc test to find out the paired mean differences, if any and it was presented in table 2A.

Table 2A The Scheffe's Test for the Differences between Paired Means on Cardiorespiratory Endurance

FTG	STG	CG	MD	CI
1464.26	1588.04		123.77*	14.56
1464.26		1419.70	44.57*	14.56
	1588.04	1419.70	168.34*	14.56

*Significant at .05 level of confidence

The table 2A showed that the mean difference values between FTG and STG, FTG and CG and STG and CG on cardiorespiratory endurance were 123.77, 44.57 and 168.34 respectively which were greater than the required confidence interval value 14.56. The results of the study showed that there was a significant difference between FTG and STG, FTG and CG and STG and CG on cardiorespiratory endurance.

Conclusion

The results of the study showed that there was a significant difference among fartlek training group, Sand training group and control group on muscular endurance and cardiorespiratory endurance.

And also, it was showed that there was a significant change in muscular endurance and cardiorespiratory endurance due to Fartlek training and Sand training.

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